Progress Toward Standards

Grade 4

Mathematics

Framework

1/13/03

Strand 1: Numbers and Operations

Standard 1.1: Students demonstrate understanding of number concepts.

In the grade 4 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- reading and writing whole numbers to one million
- recognizing place value in whole numbers to one million
- rounding whole numbers to a specified place value position of ten thousand or less
- ordering whole numbers to one million with and without the use of inequality symbols and number lines
- recognizing and generating equivalent expressions of whole numbers (composing and decomposing whole numbers)
- relating commonly used fractions to regions, sets, and number lines
- relating decimal notation (tenths and hundredths) to region and number line models and to place value
- recognizing equivalent fractions and equivalent decimals when presented with models
- ordering fractions and ordering decimals when presented with models
- recognizing odd and even numbers and numbers found by skip-counting
- recognizing factors and multiples

Standard 1.2: Students demonstrate an understanding of the concepts of operations.

In the grade 4 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- relating multiplication and division to pictorial models of the operations
- relating addition, subtraction, multiplication, and division to real life situations, including division situations requiring interpretation of a remainder
- recognizing the relationships among the four operations on whole numbers
- applying the commutative, associative, and identity properties, as well as recognizing the role of zero in multiplication
- creating story problems that can be solved using given number sentences or operations
- adding simple fractions based on pictorial models

Standard 1.3: Students demonstrate fluency in computing and estimating.

In the grade 4 test, fluency is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- adding and subtracting whole numbers and money
- multiplying whole numbers and money not to exceed the product of a 3-digit and a 2-digit number
- dividing whole numbers not to exceed the quotient of a 4-digit number divided by a 1-digit number
- estimating based on the operations described above
- solving one- and two-step story problems

Strand 2: Algebra

Standard 2.1: Students demonstrate understanding of patterns, relations, and functions.

In the grade 4 test, facility is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- finding designated terms in a numeric or geometric pattern up to three positions beyond the displayed terms
- determining missing terms in numeric and geometric patterns
- representing rules for numeric patterns using words or symbols
- creating patterns, given a simple rule

Standard 2.2: Students demonstrate the ability to use algebraic symbols to represent and analyze situations.

In the grade 4 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- representing real life situations with addition, subtraction, multiplication, and division open sentences
- identifying the missing number, represented by a box, symbol, or letter, in an addition, subtraction, multiplication, or division open sentence
- finding replacements for variables, represented by boxes, symbols, or letters, to make number sentences true

Standard 2.3: Students demonstrate the ability to create models to represent mathematical relationships.

In the grade 4 test, ability is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- recognizing different representations (e.g., words, charts, and graphic representations) of the same simple linear real life situation

Standard 2.4: Students demonstrate an understanding of change in a variety of situations.

In the grade 4 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- matching a situation involving a constant rate of change to a chart, bar graph, or pictograph that best represents that situation

Strand 3: Geometry

Standard 3.1: Students demonstrate understanding of two- and three-dimensional geometric shapes and the relationships among them.

In the grade 4 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- using properties to describe, identify, and sort 2- and 3-dimensional figures [Vocabulary in addition to that for Grade 3: polygon; kite; pentagon; hexagon; octagon; line; line segment; parallel, perpendicular, and intersecting lines]
- recognizing two- and three-dimensional figures irrespective of their orientation
- recognizing the results of subdividing and combining shapes, e.g., tangrams
- recognizing congruent figures (having the same size and shape), including shapes that have been rotated

Standard 3.2: Students demonstrate understanding of coordinate systems.

In the grade 4 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- describing motion involving distance and direction on a grid or map, including maps with compass roses
- locating points on a grid with one axis labeled with letters and the other with numbers

Standard 3.3: Students demonstrate understanding of symmetry and transformations.

In the grade 4 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- identifying a symmetric figure and determining all its lines of symmetry
- recognizing slides, flips, and turns of pictured objects or geometric figures

Standard 3.4: Students demonstrate an ability to perform visual and spatial reasoning.

In the grade 4 test, ability is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- visualizing the effect of procedures such as cutting a figure from a folded piece of paper
- identifying a net (pattern) of a simple 3-dimensional figure such as a cube
- identifying views (e.g., front, top, right side) of a three-dimensional object or a structure built from cubes

Strand 4: Measurement

Units that may be used in the Grade 4 test in addition to those listed for Grade 3:

Linear measurement: mile, millimeter, kilometer
Capacity: milliliter
Weight/Mass: ton
Time: seconds

Standard 4.1: Students demonstrate understanding of concepts and processes of measurement.

In the grade 4 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- selecting the best tool to use to measure length, capacity, weight/mass, or temperature of given object
- selecting the best unit to use for a length, capacity, or weight/mass measurement
- recognizing that the size of the number in a measurement is dependent on the size of the unit used
- performing one-step conversions between pairs of the following: inches, feet, and yards; millimeters, centimeters, and meters; cups, pints, quarts, and gallons; milliliters and liters; ounces and pounds; grams and kilograms; minutes, hours, days, weeks, and months
- making reasonable estimates of length, capacity, weight, or temperature for a given object or situation

Standard 4.2: Students demonstrate facility with the tools, procedures, and formulas of measurement.

In the grade 4 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- using rulers to measure lengths to the nearest inch, half inch, quarter inch, or centimeter
- telling time from analog and digital clocks to the nearest minute
- using a calendar to determine days of the week, dates, and lapsed time
- solving problems involving lapsed time
- reading a pictured thermometer or scale to the nearest degree or whole number
- determining the value of a set of pictured coins and bills
- finding the perimeter of (distance around) a polygon
- finding the area of rectangle or of a region made up of squares and half squares shown on a grid or dot paper
- finding the volume of a prism composed of unit cubes

Strand 5: Data Analysis and Probability

Standard 5.1: Students demonstrate facility in collecting, organizing, and displaying data.

In the grade 4 test, facility is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- selecting questions to be asked and groups to be surveyed for a given purpose
- collecting and organizing data, e.g, using charts, tally charts, and organized lists
- reading and constructing bar graphs and pictographs

Standard 5.2: Students demonstrate an understanding of statistical methods.

In the grade 4 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- recognizing the most common data point (mode) and the "middle" data point (median) in a set of data
- making informal judgments regarding the shape and spread of data sets

Standard 5.3: Students demonstrate the ability to draw conclusions and make inferences based on data.

In the grade 4 test, ability is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- drawing conclusions and making simple inferences and predictions based on data given in charts, bar graphs, or pictographs

Standard 5.4: Students demonstrate an understanding of probability.

In the grade 4 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- judging events as impossible, very likely, unlikely, or certain
- finding all possible outcomes of an experiment using a simple tree diagram or an organized list
- determining which outcomes in simple experiments are most (least) likely to occur, e.g., in experiments involving spinners